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Causal Attribution of Choice Behavior in Three N-Person Prisoner's Dilemmas

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The major purpose of the present study was to compare the causal attributions made by Cooperators and Defectors for a cooperative and a noncooperative target in an N-Person Prisoner's Dilemma. Factor analyses of attributions yielded two factors associated with the target's intrapersonal processes. One intrapersonal factor was a combination of weakness and lack of intelligence, labeled Ignorance, and the second was related to good versus bad, labeled Concern for Others. Among Cooperators, noncooperation was attributed more than cooperation to Ignorance. Defectors did just the opposite. This supports the idea that one's own predisposition prescribes criteria for rational choice in Prisoner's Dilemma. Both Cooperators and Defectors attributed cooperation more than noncooperation to Concern for Others. However, Cooperators made the largest discriminations on this factor. The above findings were observed in three N-Person Prisoner's Dilemmas varying in the extent to which Fear and Greed could be the cause of noncooperation. In addition to Ignorance and Concern for Others, factor analyses revealed two factors associated with the situational pressures of Fear and Greed in the payoff matrix itself. The different dilemmas appeared to affect both Cooperators' and Defectors' attributions to Fear and Greed in a manner consistent with their underlying game theoretical differences. © 1990

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INTRODUCTION

One of the most thoroughly studied forms of social interdependence is the Prisoner's Dilemma, which Kahan (1974) describes as arising from two conflicting definitions of rationality, one individualistic and the other collective (see also Colman, 1982; Hamburger, 1979; Pruitt and Kimmel, 1977). Individual rationality prescribes noncooperation; irrespective of others' behavior, the defecting (D) or noncooperative choice leads to individual outcomes equal to or higher than the cooperative (C) choice (Luce and Raiffa, 1957). Collective rationality prescribes cooperation; collective cooperative behavior pays off more to each person than collective noncooperation.

For the past 30 years, experimental social psychology has devoted much attention to the determinants of cooperation and noncooperation in the 2-person (PDG) and N-Person Prisoner's Dilemma (NPD) (for reviews see Dawes, 1980; Messick & Brewer, 1983; Pruitt & Kimmel, 1977). In the present study we attempted to extend previous research by focusing on cognitive processes associated with choices in NPDs. The primary purpose was to compare Cooperators' and Defectors' causal attributions for the cooperative and noncooperative choices of others. These attributions were examined in three different NPDs varying in the extent to which Fear and Greed could motivate noncooperation. The purpose of studying different NPDs was twofold. First, it allows for a determination of the generality of our findings. Second, we were interested in examining whether the causal analyses of naive subjects correspond to the game theoretical differences underlying these dilemmas.

Causal attributions were examined by a procedure developed by Wimer and Kelley (1982). In this procedure, the subject was asked to write a paragraph providing the most probable cause for a target person's choice. Once written, the subject was asked to indicate how much they agree with a series of statements that describe the self-generated paragraph. Our statements were selected in an effort to examine two types of attribution: (a) those associated with intrapersonal processes of the target and (b) those associated with external, objective features of the dilemma itself. Intrapersonally, we focused on attributions associated with the rationality (or intelligence), potency (or strength), and morality of the target. For the external processes we attempted to capture attributions related to Fear and Greed.

Intrapersonal Bases for Attribution in NPDs

Rationality. In Prisoner's Dilemma each person is faced with two choices, each simultaneously rational and irrational, or wise and foolish (cf. Kahan, 1974). From the individualistic perspective the noncooperative choice should be considered as intelligent and the cooperative

choice as unintelligent, while the opposite holds for a collective viewpoint.

If one accepts the idea that a perceiver's own goal or predisposition affects his/her choice and also indicates the perspective (Collective or Individualistic) taken on rationality, it follows that attributions to intelligence should be determined by the combination of the target's choice and the subject's own choice. Cooperators are likely to take the collective view and to attribute Cooperation more than Noncooperation to intelligence. Conversely, Defectors are likely to take an individualistic perspective and to attribute Noncooperation more than Cooperation to intelligence.

Morality and potency. We anticipated two additional attributions associated with intrapersonal processes of the target, namely, attributions to goodness/badness, or Morality, and to weakness/strength, or Potency (cf. Osgood, Suci, & Tannenbaum, 1957). The importance of morality and potency as two different interpretations of interdependent behavior has been demonstrated by Kelley et al. (1970) and Liebrand, Jansen, Rijken, and Suhre (1986). Both studies indicate that cooperation is seen as more moral, but as less potent than noncooperation. For attributions it was expected that a cooperative choice would be attributed more to the target's morality and that noncooperation would be seen as a consequence of potency.

Further, we expected that Cooperators and Defectors would differ in the degree to which morality and potency are judged as causes of cooperative and noncooperative choice. This was based on the "Might over Morality" effect observed by Liebrand et al. (1986). They showed that the connotative meaning of cooperation and noncooperation is more involved with morality among Cooperative judges and with potency among Noncooperative ones. Extending this effect to attributions, it follows that the subject's own choice should moderate these causal analyses, with Cooperators emphasizing the morality difference more than Defectors and Defectors emphasizing the potency difference between a cooperative and noncooperative target more than Cooperators.

Properties of the Dilemma: Fear and Greed as Situational Bases for Attribution of a Noncooperative Target

In addition to the intrapersonal process described above, causal analysis of choice behavior may be driven by features of the specific dilemma payoff structure. In the present study we manipulated payoffs to produce three different dilemmas that vary in the extent to which Fear and Greed could be a cause of noncooperation. Fear is the aversive pressure corresponding to the loss avoided by noncooperation when the others do not cooperate, and Greed is the appetitive pressure corresponding to the profit one enjoys by noncooperating when others do cooperate (Coombs,

1973; Rapoport, 1967). In one dilemma, the only pressure for noncooperation was Greed, in another only Fear, and in the third both Fear and Greed.

These three dilemmas allow us to see if naive subjects' causal analyses of choice are sensitive to the formal game theoretical mechanisms described above. If naive subjects understand the games in the same way as game theorists, then attributions of Noncooperation to Fear (and Greed) should increase proportionally with the level of Fear (Greed) in the payoff structure.

Finally, the three NPDs enable us to examine whether subjects themselves are more likely to noncooperate out of Greed than out of Fear, as observed by Komorita, Sweeney, and Kravitz (1980) and Simmons, Dawes, and Orbell (1984), or the opposite, as observed by Wyer (1969) and Yamagishi and Sato (1986).

METHOD

Subjects

Seventy-six female and 74 male Dutch subjects were recruited through an advertisement in a university paper. The average age of the subjects was 22.5 years, ranging from 14 to 37.

Design

The main design consisted of two between-subjects and one within-subject factor, labeled "Own Choice" (Cooperator/Defector), "Game Type" (Fear Only, Greed Only, Fear and Greed), and "Target Person" (Cooperative/Noncooperative), respectively.

Procedure

The subjects were individually invited to the laboratory, where they participated in groups of five. Six persons were invited to each session to minimize the possibility of fewer than five attending. In every session five or six subjects showed up.

The subjects were seated at five different tables arranged to prevent observation of each others' response sheets; communication between subjects was prohibited. Before the study began each subject was told that the amount of money earned would be determined by their own and others' decisions during the experiment. The subject's first task was the N-Person Prisoner's Dilemma in which each subject chose between cooperation and noncooperation. This initial task was the basis for classifying subjects as Cooperators and Defectors. Next, subjects provided causal explanations for the choices of two targets, one of whom had chosen cooperatively and the other noncooperatively.

The N-Person Prisoner's Dilemmas: Fear and Greed, Greed Only, and Fear Only

For the first task, individual subjects were randomly assigned to one of three NPD games, each corresponding to one level of a between-subjects variable: (a) Fear and Greed (FG) (b) Greed Only (GO), and (c) Fear Only (FO). In these games, Greed was operationalized in terms of the profit gained by not cooperating when all others cooperate. Fear was operationalized in terms of the loss avoided by noncooperating when the others are universally noncooperative. The different payoff structures for the three games are shown in Table 1.

TABLE 1
THE PAYOFF STRUCTURES IN THE FEAR AND GREED, THE FEAR ONLY, AND
GREED ONLY NPDs

Own choice:	Fear and Greed		Fear Only		Greed Only	
	C	D	C	D	C	D
Number of cooperative others						
<4	7.5	15	7.5	15	15	15
=4	22.5	30	22.5	22.5	22.5	30

In each game every subject was given an initial stake of 15 Dutch guilders (Dfl. 15 was about \$6) and told that their first task would be to choose between contributing or not contributing half this stake (Dfl. 7.50) to a common pool. In all three dilemmas, contribution and noncontribution corresponded to cooperation and noncooperation, respectively. Next the specific payoff structure of each game was explained.

Instructions for the *Fear and Greed* game emphasized two features of its payoff structure. First, to establish Greed, each subject was shown that it was possible to profit from not contributing when all others contributed. Specifically, if all four others contributed, the subject would receive a bonus of Dfl. 15 regardless of subject's own choice. As can be seen from Table 1, the total outcome for not contributing was Dfl. 30 (the initial Dfl. 15 plus the Dfl. 15 bonus) and the total outcome for contributing was only Dfl. 22.5 (the initial Dfl. 15 minus the Dfl. 7.5 contribution plus the bonus of Dfl. 15). Thus, given universal cooperation in others, noncooperation was more profitable than cooperation by Dfl. 7.5. To establish Fear it was pointed out that if the others were NOT universally cooperative, no bonus would be provided. In this no-bonus case, the subject could not profit beyond the initial Dfl. 15 stake. The total outcomes for not contributing and for contributing were Dfl. 15 and Dfl. 7.5, respectively. Thus, the choice to contribute would cost the subject Dfl. 7.5 and the loss could be prevented by not contributing.

In the *Greed Only* game, Fear was absent. This was accomplished by stating that if others' cooperation was not unanimous, the subject's contribution would be returned if one had been made. Therefore if the four others were not universally cooperative, cooperation would NOT be more costly than noncooperation: the total outcome for both cooperation and noncooperation was Dfl. 15 (see Table 1). As in the FG game, Greed was established by providing a Dfl. 15 bonus to the subject if all four others cooperated. In this case, noncooperation (total payoff = Dfl. 30) was Dfl. 7.5 more profitable than cooperation (total payoff = Dfl. 22.5) (see Table 1).

Finally, in the *Fear Only* Game, Greed was absent. This was accomplished by stating that the size of the bonus produced by others' universal cooperation would depend on the subject's own choice: the bonus would be Dfl. 7.5 if the subject chose not to contribute, and Dfl. 15 otherwise. Thus, given universal cooperation by others, noncooperation and cooperation produced the same final outcome of Dfl. 22.5 (see Table 1). Fear was established by making the subject's contribution nonreturnable when the others were not universally cooperative and also by providing no bonus. Thus, noncooperation (total payoff = Dfl. 15) was Dfl. 7.5 less costly than cooperation (see Table 1).

Following the explanation of the game, a quiz was administered to check for comprehension. If the subject answered fewer than 4 of the 5 questions correctly, the game was explained again. Throughout the instructions and the quiz no suggestions were given as

to contribute or not. Once the subjects understood the task, each was asked to make two responses. First, to indicate the number of other group members (from 0 to 4) they expected to contribute. Second, to make a choice between contributing or not contributing Dfl. 7.5 of the initial stake to the common pool.

Causal Attributions for Cooperative and Noncooperative Behavior

Following the NPD task, but before receiving feedback about the number of cooperative others, each subject was asked to make causal interpretations of cooperative and non-cooperative choices performed by two imaginary targets. The order of target person was determined randomly for each subject.

The attribution task was based on the method of Wimer and Kelley (1982). The subject was asked to imagine a person, who in the "... choice situation like the one you were just in, did (cooperative target)/did not (noncooperative target) contribute 7.5 guilders." Each subject was next asked to write in their own words the most probable cause for this behavior.

Once the explanatory phrase had been written, the subject was asked to rate it on a set of 80 items. Ratings were made on a 5-point scale, ranging from disagree (1) to agree (5). The list of items contained all 44 used by Wimer and Kelley (1982) including seven items observed to measure good vs bad, an example being: "The reason makes good things happen." In addition to the Wimer and Kelley items, an additional 36 were created for this study. To examine attributions associated with rationality, we included five items reflecting (Lack of) Intelligence ("The reason indicates that the person does not know better."). Fourteen items associated with Potency were included ("The reason reflects a self-assured personality."). As a social dilemma instance of good vs bad, six items were intended to measure Concern for Others ("The reason makes a person be concerned for others' interests."). Nine items were associated with the concept of Greed. For example, "The reason makes a person want to win." Finally, nine more were associated with Fear ("The reason makes a person want to avoid losing."). Henceforth, we will refer to items intended to assess each of these factors as *a priori* items.

After performing the Wimer and Kelley task for each target the subjects received real feedback about the number of cooperative others in their group and were paid. The attribution data of six subjects were excluded because of missing values.

Construction of Causal Attribution Scales

The causal attributions to each target were first analyzed separately by means of principal components analyses (PCAs) in order to determine the attributional dimensions used in each case. Next, the resulting factors from each analysis were rotated to maximum similarity (Ten Berge, 1977) and the results of this rotation were used as the basis for the construction of attributional scales employed as dependent variables in analysis of variance.

PCAs of the Noncooperative Target and Cooperative Target

The PCA of the 80 items for the noncooperative target yielded 23 factors with eigenvalues greater than 1. A scree plot (Cattell, 1966) of the eigenvalues suggested that no more than four factors should be retained for rotation. Varimax rotation yielded four factors, each with a distinct and anticipated interpretation. Items with absolute loadings greater than .50 were used as the basis for each factor's interpretation.

The first factor (eigenvalue, 9.66) appeared to be a combination of potency (5 of the 14 *a priori* potency items) and intelligence (4 of 5 items) and was labeled Ignorance. Factor 2 (eigenvalue, 7.88) reflected Greed, containing 6 of the 9 *a priori* Greed items. Factor 3 (eigenvalue 5.74) was labeled Fear since it contained 8 of the 9 *a priori* Fear items. The final factor (eigenvalue, 4.10) reflected a Concern for Others: it contained 3 of the 6 items

intended to measure Concern for Others and two items intended to measure good-bad.

A separate PCA on the 80 items for the cooperative target yielded similar results. Varimax rotation of the four-factor solution produced factors similar to those obtained for the noncooperative target. Factor 1 (eigenvalue, 9.70) represented Ignorance, factor 2 (eigenvalue, 6.90) represented Concern for Others, and factor 4 represented Fear (eigenvalue, 3.75). Factor 3 (eigenvalue, 6.07) appeared to be a combination of Greed and Potency items.

Comparison of the Factor Structures

To assess the stability of the attributional factors across both targets, the four-factor solutions for each target were systematically compared. Comparison was made using a computer program (Rotations of Unequal Matrices (RUM), (Brokken, 1981) which simultaneously rotates the factor loading matrices being compared so as to maximize their similarity according to the inproduct criterion (Ten Berge, 1977). Mutual and simultaneous rotation of both factor structures avoids the problem of arbitrarily choosing one solution to serve as a standard. Postrotation Tucker's ϕ coefficients were fairly high: for Ignorance, Greed, Fear, and Concern for Others the resulting coefficients were .90, .71, .82, and .73, respectively. We conclude that across the two targets these four factors are similar.

The Scales for Ignorance, Concern for Others, Fear, and Greed

Using the maximally similar loading matrices, we constructed four internally consistent (by Cronbach's α) scales as measures of Ignorance, Concern for Others, Fear, and Greed. The scales of Ignorance and Concern for Others were constructed by selecting only those items with high (absolute loadings higher than .50) and similar loadings on the same factor across both target persons. The construction of the Fear and Greed scales was based upon the initial nine items. For the Greed scale two of the initial items were excluded to obtain a satisfactory internal consistency for the attributions to both cooperative and noncooperative behavior. Table 2 presents the scales for Ignorance (six items), Concern for Others (five items), Greed (seven items), and Fear (nine items), as well as Cronbach's α for each. For each subject, two scores were computed on each of these four scales: one for each of the two target persons.¹

RESULTS

Attributions as a Function of Own Choice, Game Type, and Target

Using the four scales just described as dependent measures, a MANOVA was conducted in which Own Choice (C or D) and Game Type (FG, FO, GO) constituted the between-subjects factors and Target (C or D) constituted the within-subjects factor. This analysis revealed three significant multivariate main effects: (a) for Own Choice, $F(4, 135) = 2.56$, $p < .05$, (b) for Game Type, $F(8, 270) = 2.42$, $p < .05$, and (c)

¹ Two discriminant function analyses in which we used all 80 items further supported the importance of Ignorance and Concern for Others as attributional dimensions along which Cooperators and Defectors differ. Discriminant analysis on attributions of cooperation showed that all items in the Ignorance scale significantly differentiated Cooperators from Defectors. None of the items in the Concern for Others scale significantly differentiated the two groups. A discriminant analysis on attributions of noncooperation showed that all items in both the Ignorance and the Concern for Others scales differentiated the two groups.

TABLE 2
THE FOUR ATTRIBUTION SCALES MEASURING IGNORANCE, CONCERN FOR OTHERS,
FEAR, AND GREED

	Target's choice	
	Cooperative	Noncooperative
	Cronbach's α	
Ignorance	.80	.82
The reason indicates that the person:		
did not think about it		
is aware of what she/he is doing*		
does not know better		
is not aware of his/her influence over others		
the reason indicates the person's clumsiness		
has limited intellectual capacities		
Concern for Others	.87	.76
The reason indicates that the person:		
wants to give chances to others as well		
is concerned about others' interest		
feels oneself responsible for others		
wants to give something to others		
wants to share profits in a fair way		
Fear	.75	.84
The reason indicates that the person:		
feels insecure		
wants to take no risks		
wants to avoid something terrible		
does not want to be controlled by coincidences		
experiences fear		
wants to know what she/he is up to		
does not have much confidence in other people		
is afraid of being exploited by others		
does not want to be the sucker		
Greed	.74	.86
The reason indicates that the person:		
always wants to win		
has an urge to possess		
wants to earn as much as possible		
wants to earn more than a reasonable outcome		
has a high need to achieve		
prefers to get as much as possible		
wants to get more than others		

Note. Only one item (with asterisk) was reversed in the scale construction.

for Target, $F(4, 135) = 9.83$, $p < .001$. In addition, two first-order interactions were detected: for Own Choice by Target, $F(4, 135) = 18.59$, $p < .001$, and for Game Type by Target, $F(8, 270) = 11.30$, $p < .001$.

All remaining multivariate effects were nonsignificant, using an α level of .05.²

Below we examine the effects on each of the attributional dimensions.

Attributions to Ignorance

Target exerted a significant main effect, $F(1, 138) = 3.91, p < .05$. Noncooperation was attributed more than cooperation to Ignorance ($M_s = 2.04$ and 1.76 , respectively). More importantly, attributions to Ignorance were affected by a strong interaction between Own Choice and Target, $F(1, 138) = 65.28, p < .001$. Cooperators and Defectors disagreed as to which behavior is most due to Ignorance. As can be seen from Fig. 1, Defectors attributed cooperation ($M = 2.19$) more than noncooperation ($M = 1.63$) to Ignorance, whereas Cooperators attributed noncooperation ($M = 2.31$) more than cooperation ($M = 1.45$) to Ignorance.

Attributions to Concern for Others

As with Ignorance, there was a strong main effect for Target, $F(1, 138) = 341.85, p < .001$, and an interaction between Own Choice and Target, $F(1, 138) = 7.31, p < .01$. Both Cooperators and Defectors agreed that cooperation more than noncooperation should be attributed to Concern for Others. Consistent with the findings of Liebrand et al. (1986), Cooperators made a larger distinction between cooperative and noncooperative targets ($M_s = 3.60$ and 1.41 , respectively) than did Defectors ($M_s = 3.40$ and 1.89). Figure 2 presents the means associated with this interaction. Tests for simple main effects associated with Own Choice revealed that the difference between Cooperators' and Defectors' attributions of cooperation to Concern for Others was not significant, $F(1, 142) = .98$, n.s., while attributions of noncooperation did differ, $F(1, 142) = 27.72, p < .001$.

Attributions to Concern for Others were also affected by the interaction between Target and Game Type, $F(2, 138) = 6.17, p < .005$. As can be seen from Table 3, it appears that as the relative amount of Greed in the game decreased (i.e., highest in GO, next most in FG, and least in FO) noncooperation was attributed to decreasing Concern for Others, $F(2, 141) = 7.32, p < .001$. Over this same ordering of games, cooperation was attributed to increasing Concern for Others, $F(2, 141) = 2.61, p < .08$. This interaction shows that our naive subjects were sensitive to the formal properties of the different games. The results presented next are further demonstrations of such sensitivity.

² A previous 2 (Own Choice) by 3 (Game Type) by 2 (Target's Choice) by 2 (Sex) showed no significant main or interaction effect for sex of subject.

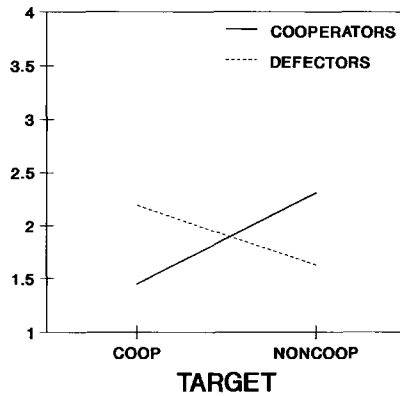


FIG. 1. Causal attributions to Ignorance as a function of own choice (Cooperators and Defectors) and target's choice (cooperative and noncooperative).

Attributions to Fear and Greed

The main effect for Target affected both types of attribution: (a) for Fear, $F(1, 138) = 77.89$, $p < .01$, and (b) for Greed, $F(1, 138) = 55.71$, $p < .001$. Noncooperation was attributed more to Fear ($M = 2.89$) and Greed ($M = 3.19$) than cooperation ($M = 2.08$ and $M = 2.44$, respectively). In addition, we observed a main effect on Greed for Own Choice, $F(1, 138) = 7.10$, $p < .01$. Defectors attributed behavior less to Greed than Cooperators ($M_s = 2.65$ and 2.94 , respectively). We also obtained a main effect for Game Type on Fear, $F(2, 138) = 4.75$, $p < .05$. Behavior was attributed most to Fear in the FO game ($M = 2.65$), next most in the FG game ($M = 2.47$), and least in the GO game ($M = 2.34$).

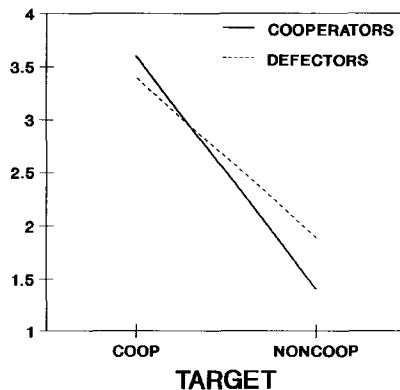


FIG. 2. Causal attributions to Concern for Others as a function of own choice (Cooperators and Defectors) and target's choice (cooperative and noncooperative).

TABLE 3
MEANS ASSOCIATED WITH THE TARGET PERSON BY GAME TYPE INTERACTION FOR THE
ATTRIBUTIONAL MEASURES OF FEAR, GREED, AND CONCERN FOR OTHERS

Target person	Game type			Attribution to
	FG	GO	FO	
Noncooperative	3.00	2.35	3.34	Fear
Cooperative	1.94	2.32	1.96	
Noncooperative	3.22	3.82	2.52	Greed
Cooperative	2.31	2.13	2.89	
Noncooperative	1.62	1.36	1.81	Concern for Others
Cooperative	3.52	3.75	3.28	

More importantly, we found a Game Type by Target interaction for both Fear, $F(2, 138) = 14.81, p < .001$, and Greed, $F(2, 138) = 36.48, p < .001$. The means associated with this interaction are presented in Table 3. Attributions to Fear correspond to the relative amount of Fear in the games. Tests for simple main effects indicated that noncooperation was attributed to Fear most in the FO game, next most in the FG game, and least in the GO game, $F(2, 141) = 17.83, p < .001$. A similar result was obtained for Greed. Noncooperation was attributed to Greed most in the GO game, next most in the FG game, and least in the FO game, $F(2, 141) = 23.57, p < .001$. Since Fear and Greed presumably motivate noncooperation, the attributions to noncooperation are straightforward demonstrations of the correspondence between subjects' causal analyses and features of the games.

Although less straightforward, the attributions of cooperative behavior to Fear and Greed are of some interest. Tests for simple main effects indicated that cooperation was attributed most to Fear in the GO game, $F(2, 141) = 5.13, p < .01$, and most to Greed in the FO game, $F(2, 141) = 14.73, p < .001$. These unexpected findings may indicate that subjects were using a sort of psycho-logic: "The only reason that the target might have been noncooperative was Greed (Fear). The target was, in fact, cooperative. Therefore, Greed (Fear) was not motivating the target's choice. So, what the target did do must be a result of Fear (Greed)."

Choice Behavior and Expectations in the Three Games

Prior to the attribution task, subjects chose between contributing and not contributing to the common pool. Their cooperation levels varied over the three NPDs from 50 to 56 to 72% in the FG, FO, and GO games

respectively. Although no significant overall effect occurred, $X^2(2) = 5.36, p < .10$, results of 1-*df* comparisons between pairs of games indicated that Fear inhibited cooperation more than Greed: (a) FG did not differ from FO, $X^2(1) = 0.36$, n.s., but (b) FG did produce more noncooperation than GO, $X^2(1) = 5.09, df = 1, p < .05$. The sex of subject exerted no main or interactive effects in any of these analyses.

In addition, we examined the relationship between choice and expectation as a function of Game Type. Using expectations (i.e., how many of the four others were expected to cooperate) as the dependent measure,³ a 2 (Own Choice) by 3 (Game Type) ANOVA revealed a highly significant main effect for Own Choice, $F(1, 142) = 111.06, p < .001$, and a significant interaction between Own Choice and Game Type, $F(2, 142) = 6.10, p < .005$. It appeared that Cooperators ($M = 3.51$) expected more others to choose cooperatively than did Defectors ($M = 1.98$) and that the expectational differences between Cooperators and Defectors were significantly greater in the FO game ($M_s = 3.77$ and 1.59) than in either the FG ($M_s = 3.57$ and 2.28) or the GO game ($M_s = 3.32$ and 2.24).

DISCUSSION

The major purpose of the present study was to compare the causal analyses of cooperation and noncooperation made by Cooperators and Defectors. The most important finding was that Cooperators' and Defectors' attributions to Ignorance were diametrically opposed. Cooperators attributed noncooperation more than cooperation to Ignorance, whereas Defectors did the opposite. In addition, they also differed in the extent to which they discriminated cooperation and noncooperation in terms of attributions to Concern for Others.

Ignorance

The Ignorance construct was a fusion of items associated with lack of intelligence, or personal shortcomings in the thinking necessary to make good decisions on the one hand and personal weakness/ineptitude on the other. The different attributional use of Ignorance by Cooperators and Defectors suggests that one's predisposition to cooperate or defect covaries with two very different perspectives on rationality, described by Kahan (1974) as collective and individualistic.

Similar to the Dawes, McTavish, and Shaklee (1977) argument that one's own choice in N-Person dilemmas determines expectations of others' behavior, we suggest that one's behavioral predisposition prescribes the perspective on rational behavior in NPDs. Specifically, if a subject is predisposed to choose noncooperatively (cooperatively), the discovery

³ Expectation data of two subjects were excluded because of missing values.

of a dominated strategy consistent with one's goals becomes a compelling and eminently rational force toward choosing the strategy. Further, since both Defectors and Cooperators assume many others behave as they do themselves, it is easy to imagine that a target who forgoes "the" rational strategy is not only seen as rather uncommon, but also as quite unintelligent or at least as someone who did not think enough before acting. The implication of this "goal prescribes rationality" explanation is that Defectors' attributions to Ignorance reflect individual *irrationality*, whereas among Cooperators it is collective *irrationality*.

Concern for Others

Both Cooperators and Defectors appear to agree that cooperation more than noncooperation flows from Concern for Others. Consistent with the findings of Liebrand et al. (1986), however, Cooperators made larger discriminations in their attributions to Concern for Others than did Defectors. This result was mainly due to Cooperators' and Defectors' attributions of noncooperation.

That Defectors saw noncooperation as more morally determined than Cooperators leads to a very interesting question for future research. To what degree do different types of people include concern with their own welfare in their definition of moral behavior? While most people would agree that morality includes a sense of obligation to one's conspecifics, there may be important differences in the way they see their moral obligations to themselves. The present findings suggest that Defectors more than Cooperators include obligation to their own welfare as a part of their moral system.

Fear and Greed

In addition to Concern for Others and Ignorance, subjects made attributions to constructs directly related to the game structural differences between the dilemmas, namely, Fear and Greed. Across the three NPDs, noncooperation rather than cooperation was seen as caused by high levels of Fear and/or Greed. In addition, attributions of noncooperation to Fear (and Greed) were directly proportional to the relative amount of Fear (Greed) in the payoff structure. These findings are important because they indicate that naive participants were capable of analyzing NPDs in terms of game theoretic considerations. Although the Prisoner's Dilemma paradigm may appear somewhat abstract in its elementary representation (cf. Nemeth, 1972), it elicits from naive participants a verbal understanding that matches game theoretical principles underlying these dilemmas.

Finally, of the two structural variables (Fear and Greed) manipulated here, Fear exerted at least as much influence on choice behavior as Greed. In addition, we observed that the relationship between own choice and expected cooperation of others was strongest in the FO game where

the amount of Greed was low. This is, at least in part, consistent with the findings of Yamagishi and Sato (1986) where the choice–expectation relationship was found to be weakest in a situation where the amount of Greed was high and Fear was low. These results together suggest that expected cooperation, or trust, may mediate the extent to which Fear and Greed are activated. Further, given the different empirical results concerning the relative importance of Fear and Greed, it seems plausible that superficially minor situational differences may have a profound impact on the activation of, and hence the relative importance of, Fear and Greed (see also Yamagishi and Sato, 1986).

All in all, the present study provides clear evidence for the idea that cognitive processes are strongly interrelated with choices in situations of interdependence and that, in addition to greed, fear or the lack of trust may play an important and unique role. From these results, one might speculate that for people predisposed to defect, the dilemma may be to make either a rational (noncooperative) or a moral (cooperative) choice, while for people predisposed to choose the conditional cooperative alternative, there should be less of a dilemma in terms of rationality and morality, at least when they have sufficient trust in others' cooperation.

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